Science

Key Stage 3

Tier 5 -7

Science Test

Practice Paper A

Write your name and school in the space below. Do not open this booklet until your teacher tells you to.

Name: _____

School: _____

Remember
Answer all questions
Calculators are allowed
Do not use rough paper – all working should be done on the test paper itself.

1 Hour

Marks ____/70

Theresa Knott 2006

1) Magnets

The diagram shows two plotting compasses near the poles of a bar magnet. The black end of the compass is its north pole.

a) label the poles of the magnet. (1)

b) Draw on the diagram what the magnetic field pattern may look like. (1)

c) Decide if the magnet would attract, repel, or do nothing if the following objects were brought near the **north** pole of the magnet.

i) Steel paper clip _____

ii) North pole of another magnet _____

iii) Plastic paper clip _____

iv) Brass drawing pin _____

(2)

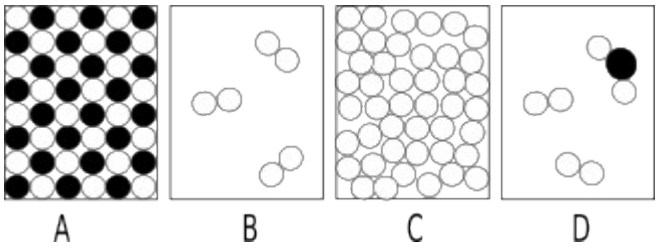
2) Diet

Match the dietary requirement with its function on the body. one has been done for you.

carbohydrates	makes muscle
vitamins and minerals	A good source of energy
protein	Helps food pass through the gut
fats	insulation and a good source of energy
fibre	Strengthens teeth and bones, keeps cells healthy

(2)

3) States of matter, elements and compounds, the periodic table.



a) The diagrams above all represent particles. For each box A, B, C, and D state whether the material is a *solid*, *liquid* or *gas* and whether it is an *element*, *compound* or *mixture.*

A is a _____ and a _____

B is a _____ and a _____

C is a _____ and a _____

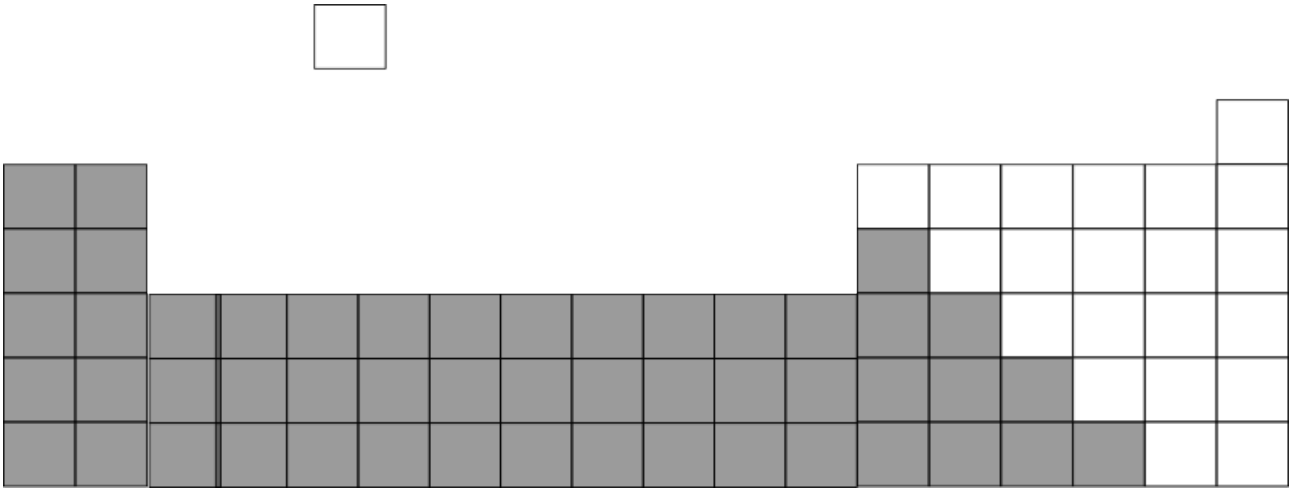
D is a _____ and a _____ (4)

b) The diagram below shows the first 86 elements of the periodic table.

i) Mark on the diagram where the noble gases would be found. (1)

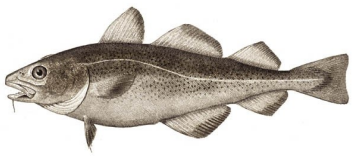
ii) What type of elements are represented by the grey squares?

_____ (1)



4) **Cod fishing**

Cod are an abundant fish in the North Sea and are an important food source in the UK.

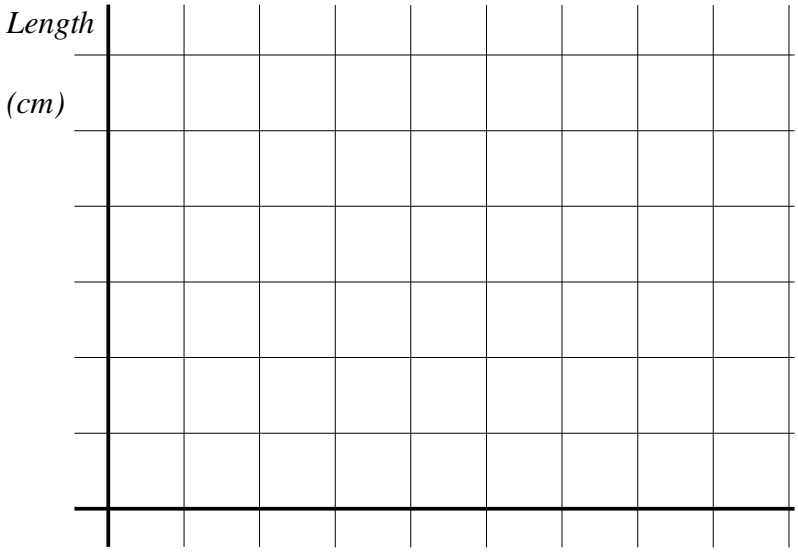


a) Name two ways in which a cod is adapted to live in the ocean

_____

_____ (2)

Cod are a slow growing fish and take 3 years before they become old enough to reproduce. The table shows then average length of a cod as it grows.



Age of cod (years)	***Average Length (cm)***
1	11
3	32
5	50
7	70
9	84
11	94
13	96

a) Plot the data as a graph. (2)

b) Suggest a possible length for a cod which was

i) 4 years old _____cm

ii) 15 years old _____cm (2)

c) The numbers of cod in the north sea have decreased dramatically in recent years. Suggest a possible reason for this.

_____

_____ (1)

d) The European commission has instructed that fisherman may not fish on certain days of the year. How might this help increase the size of the cod population?

_____

_____(1)

e) The fisherman have also been ordered to use nets with larger holes. How might this help the increase the cod population?

_____

_____(1)

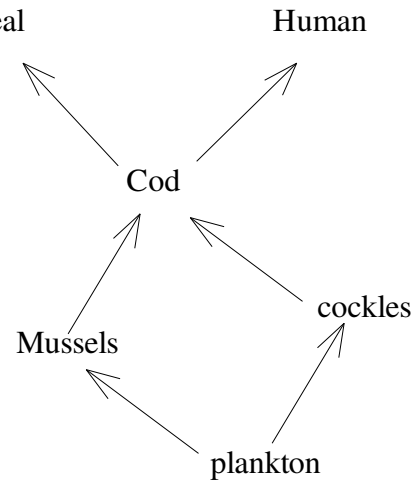
f) The diagram below right shows part of the food web that cod belongs to. If the cod population is reduced further by overfishing what may happen to-

i) The seal population? _____ (1)

ii) The plankton population? _____(1)

iii) Explain your answer to part ii_____

_____ (1)



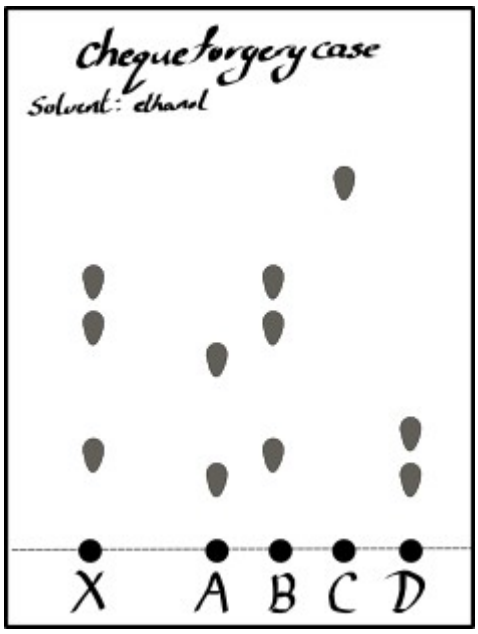
g) What type of organism is always found at the bottom of a food web? Explain your answer.

_____

_____

(2)

5) **Chromatography**



A company director suspects that one of his employees is defrauding the company by forging his signature on cheques. The police are called and a forensic scientists examines the ink from on of the forged cheques and compares it with pens confiscated from various company employees.

X *is the ink on the forged cheque*

A *is the managing director*

B *is his personal assistant*

C *is the office junior*

D *is the tea lady*

a) Whose pen was used to commit the forgery?_____ (1)

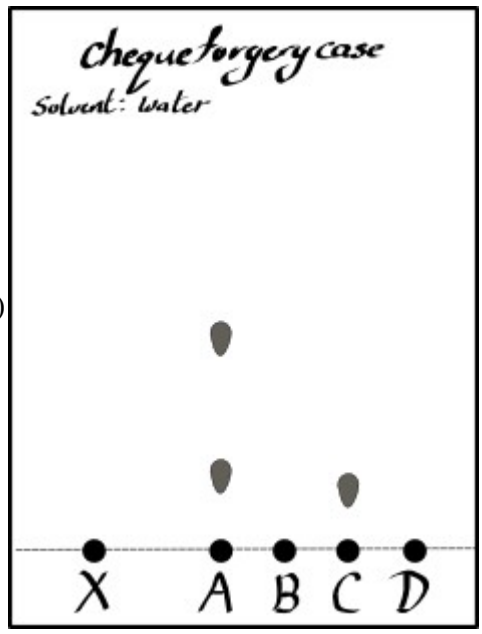
b) Explain how you know. _____

_____(2)

c) The notes on the top of the chromatogram were written in pencil. Explain why. _____

_____(1)

As a double check the police scientist decided to do the chromatogram again but this time use water as a solvent. Here are the results.



d) Explain why samples X, B, and D have not run this time.

_____

_____(1)

e) Which pen had ink containing exactly one pigment ?

_____(1)

6) Photosynthesis

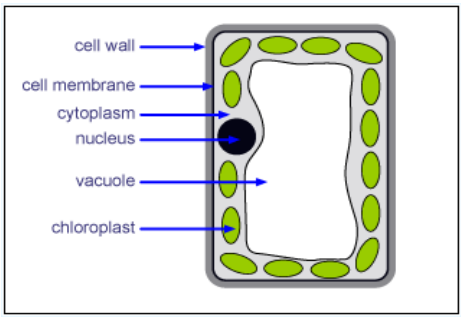
a) Complete the word equation for photosynthesis by filling in the names of the two gases involved.

water + _____ **-->** **sugar +** _____ (2)

b) What is the name of the green pigment in plants that capture the light energy from the Sun to power photosynthesis?

_____ (1)

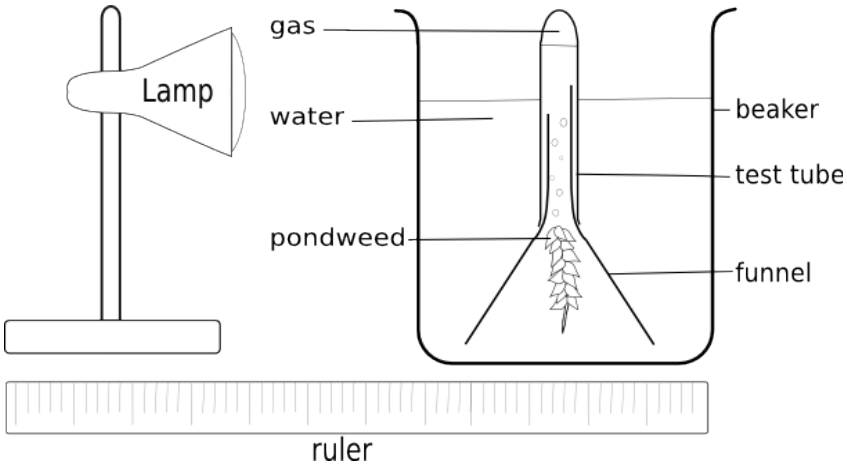
c) Where inside a leaf palisade cell does photosynthesis take place?



_____

_____ (1)

An experiment was performed to measure the **rate** of photosynthesis in Canadian pond weed. The plant was placed under a glass funnel in a large beaker of water. The beaker was placed in a dark room next to a lamp.



d) How could the rate of photosynthesis by the pondweed be measured? _____

_____(1)

e) How would you expect the rate of photosynthesis to depend on the distance the lamp is from the pondweed?

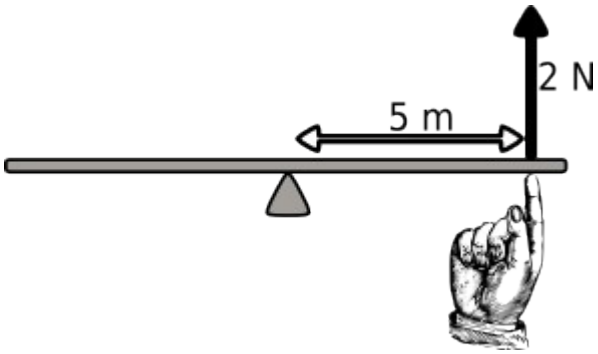
_____

(2)

7) **Moments**

Look at the diagrams below and work out the total turning moment. Do not forget to say whether it is clockwise or anticlockwise.

a) An upwards push of 2N at a distance of 5m from the pivot.

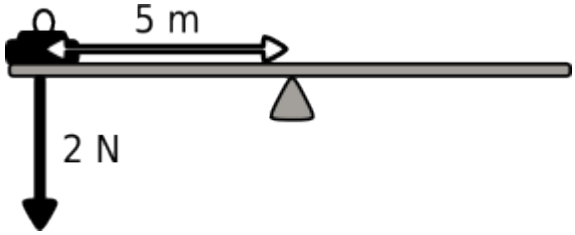


_____

_____

_____ (2)

b) A weight of mass 2N at a distance 5m from the pivot.

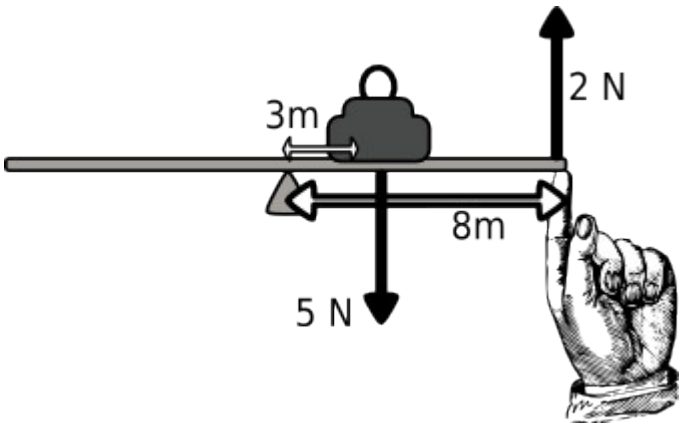


_____

_____

_____ (2)

c) An upwards force of 2N at a distance of 8m from the pivot and a downwards force of 5N at a distance of 3m from the pivot.



_____

_____

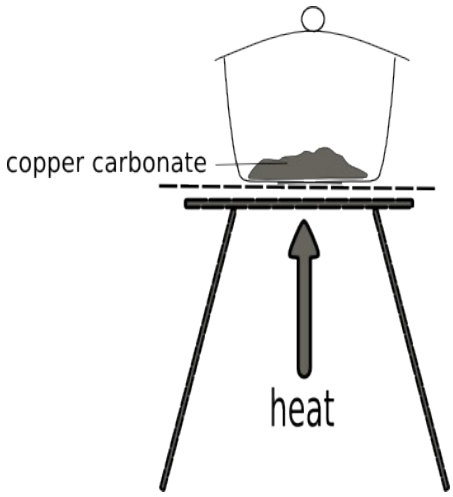
_____

_____

_____(3)

8) **Heating substances**

Copper carbonate is heated in a crucible. The heat causes the copper carbonate to chemically changed into copper oxide and carbon dioxide.



The crucible was weighed when it was empty and found to have mass **30.00 g**

It was then weighed after some copper carbonate was added and it now weighed **35.36 g**

After the heating, the crucible was reweighed. This time it weighed **33.87 g**

a) Explain why the crucible is lighter after heating. _____

_____ (1)

If magnesium is heated instead of copper carbonate a different reaction takes place. The magnesium burns to a form a white ash. Instead of a mass decrease there is a mass **increase**.

weight of crucible + magnesium metal = 35.62g

weight of crucible + magnesium ash = 37.98 g

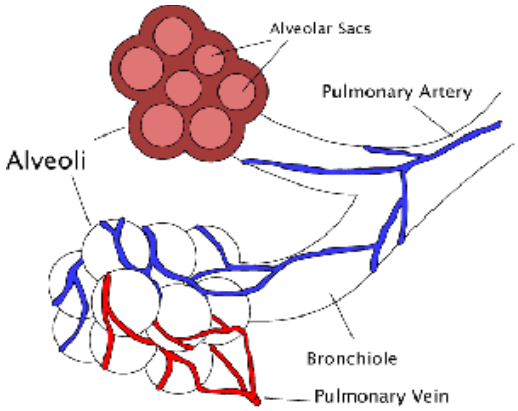
b) Explain the cause of the mass increase. _____ (1)

_____

c) Write a word equation for the reaction in the space below.

magnesium + _____ --> _____ (2)

9) Gas exchange



Inside the lungs, looking like tiny bunches of grapes are air sacs called alveoli. It is within these alveoli that gas exchange takes place.

a) What gas passes from the air in the alveoli **into** the bloodstream?

_____ (1)

b) What gas passes **from** the bloodstream into the air in the alveoli to be exhaled by the lungs?

_____ (1)

c) Name two features of the alveoli that make them good for gas exchange.

1. _____

2. _____ (2)

Respiration provides the body with the energy it needs. It happens in every cell of the body.

d) Complete the word equation for respiration.

glucose + _____--> water + _____ + (energy)

(2)

e) Explain why the heart pumps faster and the breathing rate increases during exercise.

_____

_____

_____ (2)

10) **Pressure and Forces**

A bicycle is free wheeling along a flat road in the direction shown. The bicycle has a weight of 350N.

a) Indicate with an arrow the direction of **friction** on the diagram. (1)

b) How big is the normal reaction force (support) of the ground pushing up on the bicycle?

_____N (1)

c) The area of the tyre in contact with the road is 1.75 cm^2 . Calculate the pressure in the tyre (show your working).

_____N/cm^2 (2)

11) **Properties of metals**

A scientist claims to have discovered a new metal and called it Satstestium.

Satstestium is a hard, shiny, malleable metal.

a) Give two other physical properties apart from those already mentioned that you would expect satstestium to posses.

1. _____

2. _____(2)

Satstestium reacts slowly with acid to give of a stream of bubbles.

b) What gas to you think those bubbles are likely to be? _____(1)

c) How would you test the gas to confirm if you are right? _____

_____(1)

If satstestium is placed in copper sulphate solution it slowly turns a reddish colour and the blue colour of the copper sulphate solution fades to colourless.

d) Complete the word equation for the reaction.

satstestium + copper sulphate --> _____ + _____ (1)

If a piece of magnesium is placed in a solution of satstestium sulphate shiny crystals appear in its surface.

e) Put the elements copper, magnesium and satstestium in order of reactivity with the least reactive at the bottom.

Most reactive

_____

_____

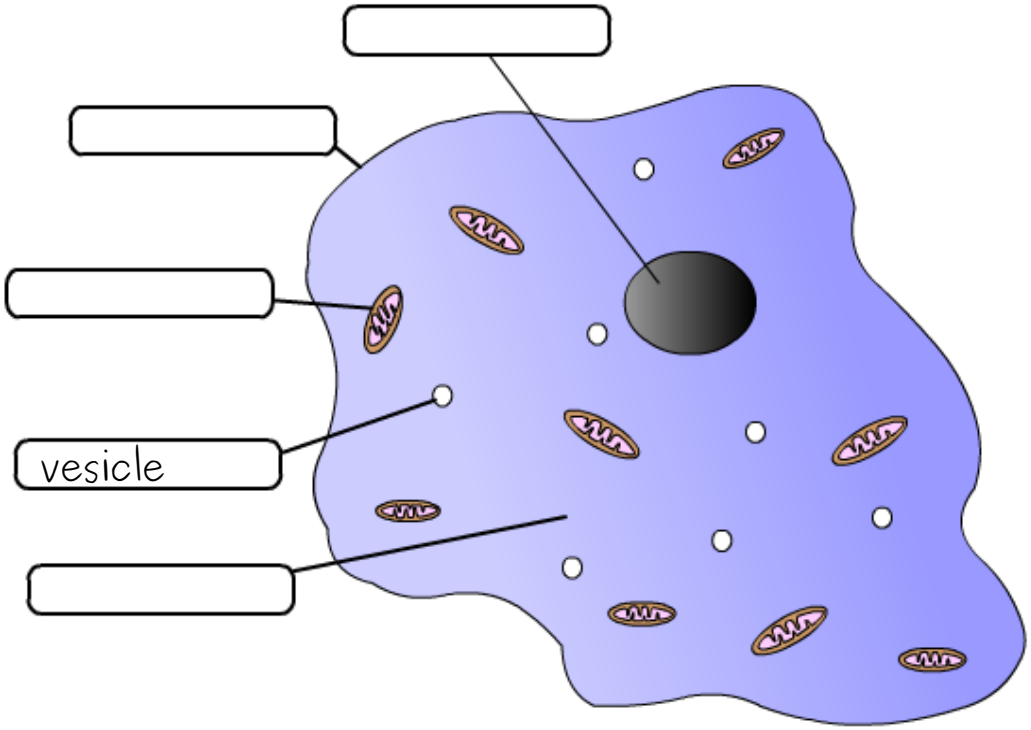
_____

Least reactive

(1)

12) Animal cells

a) Use the words provided to label the animal cell, one has been done for you.



nucleus **vesicle** **mitochondrion** **cell membrane** **cytoplasm**

(2)

b) What is the job of the cell nucleus? _____

_____(1)